

What is claimed is:

1. A liquid/liquid extraction method comprising:
providing a first solvent selected from alcohols and nonfluorinated cyclic ethers and
a second solvent comprising a fluorinated solvent; and
mixing a perfluorinated polyether (PFPE) with the first and second solvents.
2. The method of claim 1 wherein the first solvent is an alcohol and is selected
from lower alcohols and halogenated alcohols.
3. The method of claim 2 wherein the first solvent is methanol.
4. The method of claim 2 wherein the first solvent is trifluoroethanol.
5. The method of claim 1 wherein the first solvent is a mixture of (a) more than
one alcohol, or (b) more than one nonfluorinated cyclic ether, or (c) an alcohol and a
nonfluorinated cyclic ether.
6. The method of claim 1 wherein the fluorinated solvent is selected from
perfluorinated hydrocarbons, hydrochlorofluorocarbons, hydrofluoroethers,
hydrofluorocarbons, hydrohalofluoroethers, perfluorinated amines and perfluorinated cyclic
ethers.

7. The method of claim 6 wherein the fluorinated solvent is a perfluorinated hydrocarbon.
8. The method of claim 7 wherein the fluorinated solvent is perfluorohexane.
9. The method of claim 1 wherein the second solvent is a mixture of more than one fluorinated solvent.
10. The method of claim 9 wherein the second solvent is a mixture of a perfluorinated hydrocarbon or a perfluorinated cyclic ether with a hydrochlorofluorocarbon, a hydrofluoroether, a hydrofluorocarbon, or a hydrohalofluoroether.
11. The method of claim 1 wherein the PFPE is a mixture of a first PFPE having hydroxyl end groups and a second PFPE having di-hydroxyl end groups.
12. The method of claim 1 wherein the PFPE has the general structural formula:
$$\text{R-CF}_2\text{-O-(CF}_2\text{O)}_m\text{-(CF}_2\text{-CF}_2\text{-O)}_n\text{-CF}_2\text{-R}$$

where m and n are integers and
$$\text{R} = \text{-CH}_2\text{OCH}_2\text{CH(OH)CH}_2\text{OH}.$$

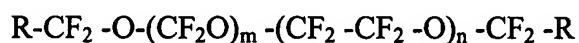
13. The method of claim 1 wherein mixing comprises mixing the PFPE with the first solvent, dispensing the mixture of the PFPE and first solvent on top of the second solvent, and condensing the second solvent onto the mixture of the PFPE and first solvent.

14. The method of claim 13 further comprising thereafter separating the first and second solvents and evaporating each solvent to extract PFPE with lower molecular weights from the first solvent and PFPE with higher molecular weights from the second solvent.

15. A method for separating a perfluorinated polyether (PFPE) into two molecular-weight distributions comprising:
- providing an alcohol solvent and a fluorinated solvent;
 - mixing the PFPE with the solvents in a liquid/liquid extractor;
 - after mixing, separating the solvents; and
 - evaporating each solvent to extract PFPE with lower molecular weights from the alcohol and PFPE with higher molecular weights from the fluorinated solvent.
16. The method of claim 15 wherein the alcohol is methanol.
17. The method of claim 15 wherein the alcohol is trifluoroethanol.
18. The method of claim 15 wherein the fluorinated solvent is selected from perfluorinated hydrocarbons, hydrochlorofluorocarbons, hydrofluoroethers, hydrofluorocarbons, hydrohalofluoroethers, perfluorinated amines and perfluorinated cyclic ethersfirst solvent is trifluoroethanol.
19. The method of claim 18 wherein the fluorinated solvent is a perfluorinated hydrocarbon.
20. The method of claim 19 wherein the fluorinated solvent is perfluorohexane.

21. The method of claim 15 wherein the second solvent is a mixture of a perfluorinated hydrocarbon or a perfluorinated cyclic ether with a hydrochlorofluorocarbon, a hydrofluoroether, a hydrofluorocarbon, or a hydrohalofluoroether.

22. The method of claim 15 wherein the PFPE has the general structural formula:

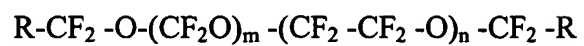


where m and n are integers and



23. The method of claim 15 wherein the PFPE is a mixture of a first PFPE having hydroxyl end groups and a second PFPE having di-hydroxyl end groups, and wherein evaporating the fluorinated solvent to extract PFPE with higher molecular weights also extracts the first PFPE.

24. The method of claim 15 wherein the PFPE is a mixture of first and second PFPEs having the general structural formula:



where m and n are integers, and where R = -CH₂OH for the first PFPE, and

R = -CH₂OCH₂CH(OH)CH₂OH for the second PFPE.